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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/032,446	01/02/2002	Toshitsugu Yamamoto	009683-392	8139

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EXAMINER	
THOMPSON, JAMES A	
ART UNIT	PAPER NUMBER
2625	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/21/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/032,446	YAMAMOTO, TOSHITSUGU	
	Examiner	Art Unit	
	James A. Thompson	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 October 2006 and 28 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-6,10 and 13-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-6,10 and 13-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 30 October 2006 has been entered.

Response to Arguments

2. Applicant's arguments filed 30 October 2006 have been fully considered but they are not persuasive. Applicant's arguments have been fully addressed in the Advisory Action mailed 17 November 2006. The newly entered amendments to the claims are fully addressed in the prior art rejections set forth below.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 4-6, 10 and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishiguro (US Patent 6,501,566 B1) in view of obvious engineering design choice.

Regarding claims 1 and 10: Ishiguro discloses an image processing apparatus (figures 1-5 and column 4, lines 8-19 of Ishiguro) comprising:

- an input unit (figure 3(41) of Ishiguro) successively receiving, as inputs, image signals representing pixels (column 6, lines 23-27 and lines 40-41 of Ishiguro).
- a determining unit (figure 3(42); figure 4; column 6, lines 47-51; and column 6, line 64 to column 7, line 9 of Ishiguro) determining whether an input signal represents a white pixel (column 8, lines 46-53 of Ishiguro). Input pixels are error corrected and placed into one of four possible locations (figure 8 and column 8, lines 41-48 of Ishiguro). Since the groupings are evenly distributed, a white pixel (D=0) will necessarily be placed within the first group (D'=0~41) since

the error to be distributed will not exceed +41. In figure 8 of Ishiguro, it can be seen that 126-85=41 (second group (D'=42~126)); 211-170=41 (third group (D'=127~211)); and the error for the fourth group (D'=212~255) will be negative. Thus, a white input pixel will necessarily be grouped in the first group and processed differently from pixels that are not white, specifically pixels that have values D'=42~255.

- an error diffusion processing unit (figure 3(43-45) and column 8, lines 46-64 of Ishiguro) which outputs a signal representing a white pixel (figure 8 and column 8, lines 46-53 of Ishiguro) and calculates an error of zero and subsequent distribution of zero error to pixels (column 8, lines 51-53 of Ishiguro (D'-0=0 if D'=0)), when the input signal represents a white pixel (figure 8 and column 8, lines 46-53 of Ishiguro).
- said error diffusion processing unit performs error diffusion process using a single threshold value (T1) in a binarization process (pixel value P=00, 01, 10 or 11 – see column 8, lines 48-64 of Ishiguro) smaller than a single central value (T2=127) of possible values of said image signal (figure 8 and column 8, lines 46-53 of Ishiguro).

Ishiguro does not disclose expressly that said error diffusion processing unit does not perform error calculation and subsequent distribution of error.

However, it would have been an obvious engineering design choice to simply not perform the error and error distribution calculations when the input pixel is white. Since the error for a white pixel is zero, and the subsequent error values to be distributed are zero, then eliminating the steps of error calculation and error distribution would be an obvious design modification to make since eliminating a superfluous step would increase the overall speed of image processing. An additional motivation to perform such an obvious engineering design choice would be to enhance a particular desired level (column 9, lines 27-35 of Ishiguro).

Further regarding claim 10: The apparatus of claim 1 performs the method of claim 10.

Regarding claims 4 and 13: Ishiguro discloses that said error diffusion processing unit changes the threshold value in accordance with a magnitude of the signal input through said input unit (figure 8 and column 8, lines 46-59 of Ishiguro).

Regarding claims 5 and 14: Ishiguro discloses that said error diffusion processing unit performs a process of subtracting a prescribed value before distributing a calculated error (figure 5(#5); figure 8("Error E" column in table); and column 8, lines 50-64 of Ishiguro), and adding the prescribed value before performing thresholding (figure 3(41,D,R,D') and column 6, lines 64-67 of Ishiguro).

Regarding claim 6: Ishiguro discloses an image processing apparatus (figures 1-5 and column 4, lines 8-19 of Ishiguro) comprising:

- an input unit (figure 3(41) of Ishiguro) successively receiving, as inputs, image signals representing pixels (column 6, lines 23-27 and lines 40-41 of Ishiguro).
- a determining unit (figure 3(42); figure 4; column 6, lines 47-51; and column 6, line 64 to column 7, line 9 of Ishiguro) determining whether an input signal represents a black pixel (column 8, lines 46-49 and lines 62-64 of Ishiguro). Input pixels are error corrected and placed into one of four possible locations (figure 8 and column 8, lines 41-48 of Ishiguro). Since the groupings are evenly distributed, a black pixel (D=255) will necessarily be placed within the fourth group (D'=212~255) since the error to be distributed will not be less than -43. In figure 8 of Ishiguro, it can be seen that the error for the first group (D'=0~41) will be positive; 42-85=-43 (second group (D'=42~126)); and 127-170=-43 (third group (D'=127~211)). Thus, a black input pixel will necessarily be grouped in the fourth group and processed differently from pixels that are not black, specifically pixels that have values D'=0~212.
- an error diffusion processing unit (figure 3(43-45) and column 8, lines 46-64 of Ishiguro) which outputs a signal representing a black pixel (figure 8 and column 8, lines 46-48 and lines 61-64 of Ishiguro) and calculates an error of zero and subsequent distribution of zero error to pixels (column 8, lines 61-64 of Ishiguro (D'-255=0 if D'=255)), when the input signal represents a black pixel (figure 8 and column 8, lines 46-48 and lines 61-64 of Ishiguro).
- said error diffusion processing unit performs error diffusion process using a single threshold value (T3) in a binarization process (pixel value P=00, 01, 10 or 11 – see column 8, lines 48-64 of Ishiguro) higher than a single central value (T2=127) of possible values of said image signal (figure 8 and column 8, lines 46-53 of Ishiguro).

Ishiguro does not disclose expressly that said error diffusion processing unit does not perform error calculation and subsequent distribution of error.

However, it would have been an obvious engineering design choice to simply not perform the error and error distribution calculations when the input pixel is black. Since the error for a black pixel is zero, and the subsequent error values to be distributed are zero, then eliminating the steps of error calculation and error distribution would be an obvious design modification to make since eliminating a superfluous step would increase the overall speed of image processing. An additional motivation to perform such an obvious engineering design choice would be to enhance a particular desired level (column 9, lines 27-35 of Ishiguro).

Regarding claim 15: Ishiguro discloses an image processing apparatus (figures 1-5 and column 4, lines 8-19 of Ishiguro) comprising:

- an input unit (figure 3(41) of Ishiguro) successively receiving as inputs, image signals representing pixels (column 6, lines 23-27 and lines 40-41 of Ishiguro).
- a determining unit (figure 3(42); figure 4; column 6, lines 47-51; and column 6, line 64 to column 7, line 9 of Ishiguro) determining whether an input signal represents a white pixel or a black pixel (column 8, lines 46-53 and lines 62-64 of Ishiguro). Input pixels are error corrected and placed into one of four possible locations (figure 8 and column 8, lines 41-48 of Ishiguro). Since the groupings are evenly distributed, a black pixel (D=255) will necessarily be placed within the fourth group (D'=212~255) since the error to be distributed will not be less than -43. In figure 8 of Ishiguro, it can be seen that the error for the first group (D'=0~41) will be positive; $42 - 85 = -43$ (second group (D'=42~126)); and 127-170=-43 (third group (D'=127~211)). Thus, a black input pixel will necessarily be grouped in the fourth group and processed differently from pixels that are not black, specifically pixels that have values D'=0~212. Further, a white pixel (D=0) will necessarily be placed within the first group (D'=0~41) since the error to be distributed will not exceed +41. In figure 8 of Ishiguro, it can also be seen that 126-85=41 (second group (D'=42~126)); 211-170=41 (third group (D'=127~211)); and the error for the fourth group (D'=212~255) will be negative. Thus, a white input pixel will necessarily be grouped in the first group and process-ed differently from pixels that are not white, specifically pixels that have values D'=42~255.
- an error diffusion processing unit (figure 3(43-45) and column 8, lines 46-64 of Ishiguro) which outputs a signal representing the white pixel (figure 8 and column 8, lines 46-53 of Ishiguro) or the black pixel (figure 8 and column 8, lines 46-48 and lines 61-64 of Ishiguro) and calculates an error of zero and subsequent distribution of zero error to pixels (column 8, lines 51-53 (D'-0=0 if D'=0) and lines 61-64 of Ishiguro (D'-255=0 if D'=255)), when the input signal represents the white pixel (figure 8 and column 8, lines 46-53 of Ishiguro) or the black pixel (figure 8 and column 8, lines 46-48 and lines 61-64 of Ishiguro).
- said error diffusion processing unit performs error diffusion process using a single threshold value (T1, T2, or T3 in figure 8 of Ishiguro, depending upon relationship between input and threshold value) in a binarization process (pixel value P=00, 01, 10 or 11 – see column 8, lines 48-64 of Ishiguro) and changes the threshold value based on a relationship between the input and the threshold value (figure 8 and column 8, lines 46-64 of Ishiguro), wherein the relationship is

that the threshold value increases depending on the increase of the input (column 8, lines 46-53 of Ishiguro). The threshold value selected depends upon which group the input pixel falls within, and thus which threshold the input pixel is closest to.

Ishiguro does not disclose expressly that said error diffusion processing unit does not perform error calculation and subsequent distribution of error if the input signal is a white pixel or a black pixel.

However, it would have been an obvious engineering design choice to simply not perform the error and error distribution calculations when the input pixel is a white pixel or a black pixel. Since the error for a white pixel is zero and the error for a black pixel is zero, and the subsequent error values to be distributed are zero, then eliminating the steps of error calculation and error distribution would be an obvious design modification to make since eliminating a superfluous step would increase the overall speed of image processing. An additional motivation to perform such an obvious engineering design choice would be to enhance a particular desired level (column 9, lines 27-35 of Ishiguro).

Regarding claim 16: Ishiguro discloses that said error diffusion processing unit performs error diffusion process using a threshold value (T1) in a binarization process (pixel value P=00, 01, 10 or 11 – see column 8, lines 48-64 of Ishiguro) smaller than a central value (T2=127) of possible values of said image signal when the input signal represents the white pixel (figure 8 and column 8, lines 46-53 of Ishiguro).

Regarding claim 17: Ishiguro discloses that said error diffusion processing unit performs error diffusion process using a threshold value (T3) in a binarization process (pixel value P=00, 01, 10 or 11 – see column 8, lines 48-64 of Ishiguro) higher than a central value (T2=127) of possible values of said image signal when the input signal represents the black pixel (figure 8 and column 8, lines 46-53 of Ishiguro).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Thompson whose telephone number is 571-272-7441. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

James A. Thompson
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12 February 2007

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